

PROSPECTS FOR VLBI DETECTION OF PLANETS

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Astrometric VLBI observations of radio stars are being made to connect the **Hipparcos** star catalog to the extragalactic radio reference frame. Typically, the antennas are moved between a star and a strong, compact reference source a few degrees away every 2-3 minutes. After correlation, the strong reference source fringes are used to determine the exact delay and rate of the weak radio star fringes, allowing the risibilities to be measured and coherently integrated for the duration of the experiment. As a result accurate astrometry has been possible on radio stars with flux densities as low as 2 mJy. All five astrometric parameters (two positions, two proper motions, and one parallax) have been obtained for several stars, with formal errors and epoch-to-epoch residuals less than one milliarcsecond. A continuing effort to understand and reduce **unmodeled** systematic errors is expected to reduce the scatter in the post-fit residuals to nearly the thermal noise limit of 20 microarcseconds. At this level of precision, **phase-referenced** VLBI will be able to detect Jupiter-like planets orbiting any of five nearby radio stars at a confidence level of 4-10 sigma. Based on the example provided by our solar system, the existence of a Jupiter-like planet is indicative of a more complex planetary system that could include terrestrial planets.